To

My Mother,

Father,

Wife

And my son Asser

Physics Department
Faculty of Science
Ain Shams University

Study of Calcified Tissues as Radiation Dosimeters

A Thesis

"Submitted for the degree of Master of Science as a partial Fulfillment for requirement of the master of Science"

By

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Egyptian Atomic Energy Authority (EAEA)

(Cairo, 2014)

Physics Department
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Islam Mohamed Mohamed Mohamed

B.Sc. in physics 2006

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1.1. Introduction

The latter half of the twentieth century has been witness to a variety of releases of radioactive materials from industrial facilities, military program activities, or to over exposure of persons due to the improper use and disposal of radiation sources. These events resulted in a broad range of ionizing radiation exposure to a considerable number of people. There have been about 400 radiation accidents registered in 1944–2000 worldwide leading to confirmed significant overexposure of 3000 persons (Turai et al. 2001). Besides these accidents, there are other exposures to tens of thousands of persons at Hiroshima and Nagaski, Techa River basin, Mayak facilities and Chernobyl (Karaoglou et al. 1998; Pierce et al. 1996).

History has demonstrated that despite all precautions, Accidents are unavoidable, and preparation for future incidents is a prudent course of action. Follow-up examinations of these events have commonly found that measurements of the radioactive contamination and dose rates were insufficient to judge the full extent of the Situation. This complicates, and in some cases even prevents, proper dose assessment for exposed individuals or critical groups. Therefore, retrospective assessment of the radiation Exposure is of fundamental importance to the analysis of the radiation risk and is an essential Part of many radio-epidemiological studies. Retrospective dosimetry is also an essential tool for the assessment of individual doses as a basis for the selection of appropriate Countermeasures. In addition, despite well-established regulations and protocols for maintaining radiation protection dose limits for professionals, the assurance that these limits will not be exceeded is not guaranteed. Alternative methods to routine dosimetry for Individual dose